



United States Air Force

Air Force Materiel Command

Air Force Development Test Center, Office of Public Affairs

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FACT SHEET

Controlling Noise

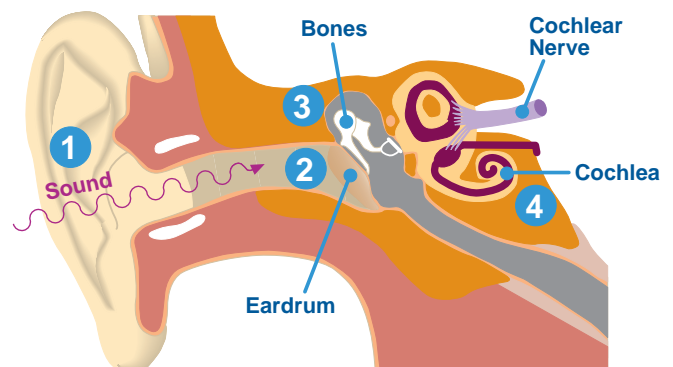
Introduction

Eglin Air Force Base is the largest air force base in the free world, including 724 square miles of land area and about 130,000 square miles of controlled airspace overlying land and water. It is the main Air Force facility for conducting developmental and operational testing of a variety of conventional weapons and weapon systems. Eglin personnel are also involved in a variety of training activities designed to maintain a high degree of operational readiness.

These testing and training activities are essential to maintaining a strong and effective national defense. Eglin's extensive water and land test areas, staff technical expertise, and modern testing facilities make it uniquely suited for these activities. Additionally, Eglin is an especially suitable training site because its terrain is similar to that found in many places

around the world where military conflicts have occurred or could occur in the future.

Noise is an unavoidable consequence of some of these testing or training activities. *Noise* is any unwanted sound or sound that interferes with or interrupts such human activities as sleep, speech, or hearing. The level of disturbance depends on how loud the noise is. Sound levels are measured in units called *decibels*.



1. When something vibrates, it makes the air around it vibrate. 2. Sound in the form of vibrating air reaches the eardrum and causes the eardrum to vibrate. 3. Tiny bones receive the vibrations from the eardrum and pass the vibrations to the cochlea. 4. The cochlea changes the vibrations to electrical messages that are carried to the brain by nerves. The brain interprets the messages as what we call sound.

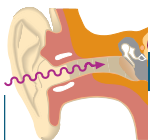
Typical Sources of Noise at Eglin

The Eglin area is affected by noise from a wide variety of sources, including general traffic from military and civilian aircraft; military aircraft on low-level or supersonic missions; rocket and missile launches; and explosions and munitions or weapons testing. Even traffic on local highways contributes to the overall noise in the area.

Complaints about noise received at Eglin often relate to low-level flying operations. Typical of the aircraft commonly flying at low altitude in the area are the C-130 transport, the AC-130 gunship and the CH-53 helicopter. These propeller-driven aircraft are by their nature slow and loud. In addition to the noise they may create by flying at low level, these aircraft may also generate noise from the type of training or testing they conduct. This often involves the firing of guns at targets on the ground. Noise is generated from both the discharge of the guns and the impact of the munitions with the ground.

Common Outdoor Sound Levels	Common Indoor Sound Levels
50 hp Siren at 50 ft	140 Threshold of Pain
1 psf Sonic Boom	130 Pneumatic Riveter
Jet Takeoff at 200 ft	120 Initial Discomfort
	110 Rock Band
Jet Flyover at 1,000 ft	100 Inside Subway Train (New York)
Gas Lawnmower at 3 ft	90 Food Blender at 3 ft
Diesel Truck at 50 ft	80 Garbage Disposal at 3 ft
Noisy Urban Daytime	70 Shouting at 3 ft
Gas Lawnmower at 100 ft	60 Vacuum Cleaner at 10 ft
Commercial Area	50 Normal Speech at 3 ft
Heavy Traffic at 300 ft	40 Large Business Office
	30 Quiet Speech at 3 ft
Quiet Urban Nighttime	20 Dishwasher Next Room
Quiet Suburban Nighttime	10 Small Theater, Large Conference Room (Background)
	0 Library
	30 Bedroom at Night
	20 Concert Hall (Background)
	10 Broadcast and Recording Studio
	0 Threshold of Hearing

Comparative noise levels, in decibels (dB)



Supersonic operations in the area can also produce high noise levels. Sonic booms created by supersonic flight can be loud enough to shatter windows or rattle structures. The sonic boom is the result of shock waves formed at the nose of an aircraft traveling at speeds greater than the speed of sound. When the shock waves reach the ground, the energy is heard as a "boom." Overland supersonic flights at Eglin are severely restricted. Supersonic testing is normally allowed only over the Gulf, well offshore from populated areas.

Another potential source of high noise levels is the testing of munition or weapon systems on the Eglin test areas. The detonation associated with a bomb exploding or a gun firing produces a pressure wave that travels out in all directions. The size and energy of this pressure wave depend on the amount of explosive used. As this pressure wave moves away from the detonation point, it decreases in energy, and eventually turns into the noise we hear as a boom.

The low-level training conducted at Eglin by gunships and helicopters enables U.S. aircrews to be adequately prepared in the event of conflicts. Likewise, munition or weapon systems must continually be upgraded in order to maintain their effectiveness. "Live" testing of these systems is a necessary part of the upgrading process.

The Influence of Weather on Noise

Weather conditions, such as winds or temperature, can greatly influence how noise travels through the atmosphere. Winds may push the sound wave in one direction or another, while variations in air temperature, called *inversions*, can bend or trap the sound wave. These factors can create regions of high intensity sound far from the noise source. As a result, it may be possible to detonate 1,000 pounds of explosives on a given day without producing undue noise levels in the local

community, while on another day, under the "right" weather conditions, the detonation of 10 pounds at the same location will produce unacceptable noise levels.

The preceding figure illustrates how a temperature inversion in the atmosphere can affect the sound created by a typical explosion. The sound waves from the explosion initially travel upwards, but are reflected back down towards the ground by the inversion, generating high noise levels many miles away. Noise levels at that distance would otherwise be much lower.

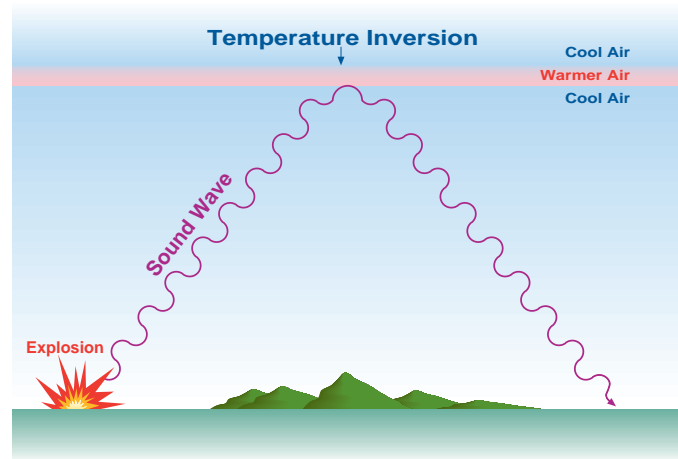
Eglin uses weather data collected on the base to run computer programs that predict the noise levels expected from a planned test. If the computer models predict unacceptable noise levels due to the existing weather conditions, the test can be rescheduled for a more opportune time. However, because atmospheric conditions change quickly, it is difficult to accurately predict exactly how sound will travel.

Controlling Noise

To reduce aircraft noise in the local area as much as possible, Eglin maintains a "good neighbor" policy. In keeping with that policy, organizations like the 46th Test Wing, 53rd Wing and the 33rd Fighter Wing follow strict noise abatement procedures. These procedures establish minimum flight altitude restrictions for different areas surrounding the base. They also require flights to avoid populated areas on low-level routes and prohibit climbs, dives, or other aircraft maneuvers that would make noise that might disturb people in the local area. Examples of specific areas scheduled flights avoid are subdivisions, schools, zoos, and ostrich and horse farms.

However, even with these procedures in place, it is not always possible to avoid creating noise disturbances in the surrounding community. Complaints about noise from Eglin are handled through the Office of Public Affairs. Once a noise complaint is received, staff from the Office of Public Affairs attempt to determine the origin of the offending noise by contacting the different organizations on the base. Not all noise complaints received at Eglin are the result of Eglin-related activities. If an organization at Eglin was responsible for causing the noise, the Office of Public Affairs will work with that organization to do everything possible to make sure a similar disturbance does not happen in the future. For example, a change may be made in the way a test is conducted or a test may be moved to another location. Finally, if it is not possible to avoid creating noise, the Office of Public Affairs will explain why the noise cannot be avoided and why the activity is necessary.

Eglin successfully conducts thousands of different missions every year, most of which are performed without any effect on the local area. For the small percentage of missions that may pose a problem due to noise, Eglin has developed an aggressive policy intended to minimize impacts to the community. Controlling noise is a challenging but important goal of the Office of Public Affairs and Eglin Air Force Base.



A temperature inversion can reflect the sound created by a typical explosion.

